

IN THE CLAIMS

1 (Original): An always-on wireless internet protocol (IP) network, comprising:

an access provider network (APN) including an always-on packet data serving node (PDSN), the APN being operable to communicate over a wireless communication link with a mobile station;

the PDSN including an inactivity timer, the PDSN being operable to set the inactivity timer to an inactivity timer starting value and send a starting value estimate to the mobile station over the wireless communication link, wherein the starting value estimate is a function of the inactivity timer starting value;

the mobile station including an inactivity timer estimate, the mobile station being operable to receive the starting value estimate and set the inactivity timer estimate to the starting value estimate; and

the mobile station being further operable to reset the inactivity timer estimate to the starting value estimate when the mobile station communicates with the APN.

2 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the mobile station includes a mobile station module that sets and resets the inactivity timer estimate.

3 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the inactivity timer starting value is a maximum value and wherein the PDSN decrements the inactivity timer from the maximum value when there is no data activity on the wireless communication link.

4 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the starting value estimate is a maximum value and wherein the mobile station decrements the inactivity timer estimate from the maximum value when there is no data activity on the wireless communication link.

5 (previously presented): The always-on wireless internet protocol (IP) network of claim 4, wherein the wireless communication link between the mobile station and the APN is maintained until the inactivity timer estimate is decremented to a pre-selected value.

6 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein if the inactivity timer estimate reaches a pre-selected value, then the mobile station being configured to enter an inactive state.

7 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein if the inactivity timer estimate reaches a pre-selected value, then the mobile station being configured to establish a new wireless communication link between the mobile station and the APN.

8 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, where the wireless communication link between the APN and the mobile station is a point-to-point protocol (PPP) session.

9 (previously presented): The always-on wireless internet protocol (IP) network claim 8, wherein the PDSN is operable to send the starting value estimate to the mobile station upon entering an IP control protocol (IPCP) open state on the PPP session.

10 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the PDSN is operable to send an updated starting value estimate to the mobile station if the inactivity timer starting value is modified.

11 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the always-on wireless IP network is a CDMA2000 network

12 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein starting value estimate is included in a link control protocol (LCP) message transmitted from the APN to the mobile station.

13 (previously presented): The always-on wireless internet protocol (IP) network of claim 12, wherein the LCP message is an Echo-Request message.

14 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the mobile station module resets the inactivity timer estimate to the starting value estimate in response to the mobile station successfully sending an Echo-Reply message to the APN.

15 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the mobile station module resets the inactivity timer estimate to the starting value estimate in response to the mobile station receiving an Echo-Request message from the APN.

16 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the mobile station module resets the inactivity timer estimate to the starting value estimate in response to PPP activity between the mobile station and the APN.

17 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the PDSN includes an always-on PDSN module that is operable to monitor activity on the wireless communication link between the APN and the mobile station and reset the inactivity timer to the inactivity timer starting value if activity is detected.

18 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the inactivity timer estimate is equal to the inactivity timer starting value.

19 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the inactivity timer is a PPP inactivity timer.

20 (previously presented): The always-on wireless internet protocol (IP) network of claim 19, wherein the inactivity timer starting value is a maximum PPP timer value.

21 (previously presented): The always-on wireless internet protocol (IP) network of claim 19, wherein the PDSN is operable to send an LCP request message to the mobile station if the PPP inactivity timer reaches a pre-selected value.

22 (previously presented): The always-on wireless internet protocol (IP) network of claim 21, wherein the PDSN includes an Echo-Reply-Timeout timer, and wherein the PDSN is operable to reset the Echo-Reply-Timeout timer to an Echo-Reply-Timeout timer starting value and reset the PPP inactivity timer to the inactivity timer starting value if the APN receives a PPP message from the mobile station.

23-24 (Canceled)

25 (currently amended): The always-on wireless internet protocol (IP) network of claim 22, wherein the PDSN includes an Echo-Request-Retries counter, and wherein if the Echo-Reply-Timeout counter reaches a pre-determined value, then the PDSN being configured to resend ~~the~~ an Echo-Request message to the mobile station and reset the Echo-Request-Retries counter from a starting value to identify a number of times that the PDSN attempts to send the Echo-Request message to the mobile station without receiving an Echo-Reply message from the mobile station.

26 (previously presented): The always-on wireless internet protocol (IP) network of claim 25, wherein if the Echo-Request-Retries counter reaches a pre-selected cutoff value, then the PDSN being configured to close the PPP session.

27-28 (Canceled)

29 (Original): A method of maintaining an always-on wireless communications link between a mobile station and an access provider network (APN), comprising:

- establishing a wireless communication link between the mobile station and the APN;
- setting an inactivity timer in the APN to an inactivity timer starting value;
- sending a starting value estimate from the APN to the mobile station that is a function of the inactivity timer starting value;
- setting an inactivity timer estimate in the mobile station to the starting value estimate;
- monitoring the wireless communication link between the mobile station and the APN for data traffic between the mobile station and the APN; and
- if data traffic is detected, then resetting the inactivity timer estimate in the mobile station to the starting value estimate and resetting the inactivity timer in the APN to the inactivity timer starting value.

30 (Original): The method of claim 29, further comprising:

- if the inactivity timer estimate reaches a pre-selected value, then establishing a new wireless communication link between the mobile station and the APN or causing the mobile station to enter an inactive state.

31 (Original): The method of claim 29, wherein the wireless communication link is a point-to-point protocol (PPP) session.

32 (Original): The method of claim 31, wherein the starting value estimate is included in a link control protocol (LCP) message transmitted from the APN to the mobile station.

33 (Original): The method of claim 32, wherein the LCP message is an Echo-Request message.

34 (Original): The method of claim 31, further comprising:

if the inactivity timer in the APN reaches a pre-determined value, then transmitting a link control protocol (LCP) Echo-Request message from the APN to the mobile station.

35 (Original): The method of claim 34, wherein if the inactivity timer in the APN reaches the pre-determined value, then resetting an Echo-Reply-Timeout timer in the APN.

36 (Original): The method of claim 35, wherein if the inactivity timer in the APN reaches the pre-determined value, then resetting an Echo-Request-Retries counter in the APN.

37 (Original): The method of claim 36, further comprising:

monitoring the wireless communication link for an Echo-Reply message from the mobile station;

if an Echo-Reply message from the mobile station is detected, then resetting each of the Echo-Reply-Timeout timer, the Echo-Request-Retries counter and the inactivity timer;

if the Echo-Reply-Timeout timer reaches a selected value, then incrementing or decrementing the Echo-Request-Retries counter and transmitting an additional LCP Echo-Request message from the APN to the mobile station; and

if the Echo-Request-Retries counter is incremented or decremented to a set value and the Echo-Reply-Timeout timer reaches the selected value, then closing the PPP session.

38-44 (canceled)

45 (currently amended): A packet data serving node (“PDSN”) configured to maintain an always-on wireless communication link with a mobile station in a wireless communication network, the PDSN comprising:

an inactivity timer, the inactivity timer configured to start upon the PDSN entering a packet data session;

a transceiver, the transceiver configured to send a starting value estimate that is a function of an inactivity timer starting value;

a processor coupled to transceiver, the processor configured to monitor the always-on wireless communication link between the mobile station and the PDSN for data traffic between the mobile station and the PDSN; and

an always-on PDSN module coupled to the processor and the inactivity timer, the always-on PDSN module configured to reset the inactivity timer to the inactivity timer starting value if the processor detects data traffic.

46 (Previously Presented): The PDSN of claim 45, wherein the packet data session includes a point-to-point (“PPP”) session.

47 (Previously Presented): The PDSN of claim 46, wherein the inactivity timer includes a PPP inactivity timer.

48 (Previously Presented): The PDSN of claim 47, wherein the inactivity timer is further configured to start upon the PDSN entering an Internet Protocol control (“IPCP”) opened state on a PPP session.

49 (Previously Presented): The PDSN of claim 45, wherein the starting value estimate is the inactivity timer starting value.

50 (Previously Presented): The PDSN of claim 45, wherein the inactivity timer starting value is a maximum PPP timer value.

51 (Previously Presented): The PDSN of claim 45, wherein the wireless communication network is a CDMA2000 network.

52 (Previously Presented): The PDSN of claim 45, wherein the transceiver is further configured to transmit a link control protocol ("LCP") message that includes the starting value estimate.

53 (Previously Presented): The PDSN of claim 52, wherein the LCP message includes an Echo-Request message.

54 (Previously Presented): The PDSN of claim 53, wherein the transceiver is further configured to transmit an LCP Echo-Request message if the inactivity timer reaches a pre-determined value.

55 (Previously Presented): The PDSN of claim 54, wherein the always-on PDSN module is further configured to initialize an Echo-Reply-Timeout timer if the inactivity timer reaches the pre-determined value.

56 (Previously Presented): The PDSN of claim 55, wherein the always-on PDSN module is further configured to initialize an Echo-Request-Retries counter if the inactivity timer reaches the pre-determined value.

57 (Previously Presented): The PDSN of claim 56, wherein the always-on PDSN module is further configured to monitor the wireless communication link for an Echo-Reply message, and to reset each of the Echo-Reply-Timeout timer, the Echo-Request-Retries counter and the inactivity timer if the always-on PDSN module detects an Echo-Reply message.

58 (Previously Presented): The PDSN of claim 57, wherein:

the always-on PDSN module is further configured to increment or decrement the Echo-Request-Retries counter, and

the transceiver is further configured to transmit an additional LCP Echo-Request message if the Echo-Reply-Timeout timer reaches a selected value.

59 (Previously Presented): The PDSN of claim 58, wherein the always-on PDSN module is further configured to close the session if the Echo-Request-Retries counter is incremented or decremented to a set value and the Echo-Reply-Timeout timer reaches the selected value.

60 (Previously Presented): The PDSN of claim 45, wherein:

the transceiver is further configured to receive at least one data packet for the packet data session, and

the always-on PDSN module is further configured to stop the Echo-Reply Timeout timer and to reset each of the Echo-Reply Timeout timer, the Echo-Request-Retries counter, and the inactivity timer, if the transceiver receives at least one data packet for the packet data session.

61 (Previously Presented): The PDSN of claim 45, wherein the at least one data packet is a point-to-point ("PPP") packet and the packet data session is a PPP session.

62-99 (canceled)